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**Ibrahim Unal\*** (iunal@metu.edu.tr), Middle East Technical University, Department of Mathematics, 06800 Ankara, Turkey. *An application of  $h$ -Principle to calibrated manifolds.*

Plurisubharmonic functions and pseudo-convexity in complex geometry are canonically generalized to any calibrated manifold  $(X, \phi)$  by Harvey and Lawson. Quite a few results proved in complex geometry via plurisubharmonic functions are also extended to calibrated manifolds. One important example of these results is the notion of  $\phi$ -free submanifolds, the analogues of the totally real submanifolds, which are used to construct families of strictly  $\phi$ -convex domains with different topological types.

Similar to totally real embeddings in complex manifolds we prove that the  $h$ -principle holds for  $\phi$ -free embeddings for coassociative calibration in  $G_2$ -manifolds, for Cayley calibration in  $Spin(7)$ -manifolds and for quaternionic calibration in Quaternion/Hyper-Kähler manifolds. Hence, we get important results about the topology of  $\phi$ -free submanifolds, especially in  $G_2$ -geometry.

In this talk, after a quick introduction to calibrated manifolds, I will try to explain similarities between complex and calibrated geometries via these new concepts and results. For the rest, I will talk about the geometry of  $\phi$ -free submanifolds and discuss the  $h$ -principle for  $\phi$ -free embeddings of closed manifolds into  $G_2$  and  $Spin(7)$ -manifolds. (Received February 01, 2016)